CLAIMS

1. A spring coil assembly comprising:

a first row of coils arranged in a first spacing pattern; and

a second row of coils adjacent the first row and arranged in a second spacing pattern different from the first spacing pattern.

2. The spring coil assembly of claim 1, wherein the second spacing pattern is achieved by using at least one less coil in the second row than is used in the first row.

3. The spring coil assembly of claim 1, wherein the first row is defined by adjacent pairs of coils, each of the adjacent pairs of coils in the first row being uniformly spaced at a first distance, and wherein the second row is defined by adjacent pairs of coils, at least one of the adjacent pairs of coils in the second row being spaced at a second distance that is different from the first distance.

4. The spring coil assembly of claim 1, further comprising:

a first column of coils arranged in a first column spacing pattern; and

a second column of coils adjacent the first column and arranged in a second column spacing pattern different from the first column spacing pattern.

5. The spring coil assembly of claim 1, wherein the second column spacing pattern is achieved by using at least one less coil in the second column than is used in the first column.

6. The spring coil assembly of claim 4, wherein the first column is defined by adjacent pairs of coils, each of the adjacent pairs of coils in the first column being uniformly spaced at a first column coil distance, and wherein the second column is defined by adjacent pairs of coils, at least one of the adjacent pairs of coils in the second column being spaced at a second column coil distance different from the first column coil distance.

7. The spring coil assembly of claim 4, wherein the coils in the first column are left-hand coils and the coils in the second column are right-hand coils.

8. The spring coil assembly of claim 4, wherein the coils in the first column are right-hand coils and the coils in the second column are left-hand coils.

9. The spring coil assembly of claim 4, wherein the first column includes a plurality of left-hand coils and a plurality of right-hand coils and the second column includes a plurality of left-hand coils and a plurality of right-hand coils and wherein the plurality of left-hand coils in the first column is out of phase with the plurality of left-hand coils in the second column and the plurality of right-hand coils in the first column is out of phase with the plurality of right-hand coils in the second column.

10. An apparatus for assembling a spring coil assembly, the apparatus comprising:

a main conveyor adapted to convey a plurality of coils along an axis;

an assembler which is operable to intertwine a plurality of coils into a spring coil assembly; and

a transfer station operable to move a plurality of coils from the main conveyor into the assembler, the transfer station including

a plurality of pusher arms, each pusher arm including a gripper which is operable to grasp an individual coil;

a carriage supporting the pusher arms; and

an actuator for shifting the carriage in a direction substantially parallel to the axis so that the plurality of coils carried by the gripper arms is displaced in the direction of travel of the conveyor.

11. An apparatus for assembling a spring coil assembly, the apparatus comprising:

a coil forming machine having a wire feed advancing mechanism and being capable of forming coils in response to the advancement of wire by the wire feed advancing mechanism;

a main conveyor adapted to convey a plurality of coils along an axis; and

a programmable control system capable of selectively varying the advancement of wire by the wire feed advancing mechanism between a consistent advancement, wherein coils are formed and placed on the main conveyor in predetermined consistent intervals, and an inconsistent advancement, wherein coils are formed and placed on the main conveyor in predetermined inconsistent intervals.

12. The apparatus of claim 11, further comprising:

a sensor element capable of producing a signal that can be selectively interpreted by the control system to stop the manufacturing of the spring coil assembly when the spacing of the coils on the main conveyor is inconsistent, or to permit the manufacturing of the spring coil assembly when the spacing of the coils on the main conveyor is inconsistent.

13. A method of arranging coils in a spring coil assembly comprising:

arranging a first plurality of right-hand coils in spaced apart relation in a first row;

arranging a first plurality of left-hand coils in spaced apart relation in the first row such that each of the first plurality of left-hand coils in the first row is located between a respective pair of right-hand coils in the first row;

arranging a second plurality of right-hand coils in spaced apart relation in a second row;

arranging a second plurality of left-hand coils in spaced apart relation in the second row such that each of the second plurality of left-hand coils in the second row is located between a respective pair of right-hand coils in the second row; and

arranging the first and second rows such that the first plurality of right-hand coils in the first row is out of phase with the second plurality of right-hand coils in the second row.

14. A method of manufacturing a spring coil assembly, the method comprising:

providing a coil forming machine having a wire feed advancing mechanism and being capable of forming coils in response to the advancement of wire by the wire feed advancing mechanism;

providing a main conveyor adapted to convey a plurality of coils along an axis; and

selectively varying the advancement of wire by the wire feed advancing mechanism between a consistent advancement, wherein coils are formed and placed on the main conveyor in predetermined consistent intervals, and an inconsistent advancement, wherein coils are formed and placed on the main conveyor in predetermined inconsistent intervals.

15. The method of claim 14, further comprising:

selectively disregarding a signal from a sensor element that is intended to stop the manufacturing of the spring coil assembly when the coils on the main conveyor are spaced at inconsistent intervals.

16. The method of claim 14, further comprising:

selectively disabling a sensor element that produces a signal intended to stop the manufacturing of the spring coil assembly when the coils on the main conveyor are spaced at inconsistent intervals.

17. An apparatus for assembling a spring coil assembly, the apparatus comprising:

an infeed conveyor adapted to convey a plurality of coils;

a main conveyor adapted to convey a plurality of coils along an axis;

a main conveyor transfer station to transfer coils to the main conveyor from the infeed conveyor;

an assembler which is operable to intertwine a plurality of coils into a spring coil assembly; and

a transfer station operable to move a plurality of coils from the main conveyor into the assembler, the transfer station including

a plurality of pusher arms, each of the pusher arms including a gripper which is operable to grasp an individual coil,

a pusher member supporting the gripper arms;

a carriage supporting the pusher member;

vertical guides which support the carriage;

a vertical actuator associated with the carriage for indexing the carriage along the vertical guides;

lateral guides which support the carriage for selective movement relative to the main conveyor in a generally horizontal direction substantially perpendicular to the axis of the main conveyor;

a lateral actuator associated with the carriage for indexing the carriage along the lateral guides,

a guide assembly on the carriage and supporting the pusher member for selective movement relative to the guide assembly in a generally horizontal direction substantially parallel to the axis of the main conveyor; and

a longitudinal actuator for shifting the pusher member in a direction substantially parallel to the axis so that the plurality of coils carried by the grippers is displaced in the direction of travel of the conveyor.